

### Closing sleeve for tunnels of folding curtains

This invention relates to a method for closing off at least one tunnel extending across the width of a folding curtain, after a strengthening rod has been introduced into this tunnel on the one hand, and a folding curtain comprising at least one tunnel extending across the width of the curtain, which has been provided with a strengthening rod according to the invention on the other hand.

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Folding curtains are often used as a decoration. A usual folding curtain is hanging straight down when it has been lowered completely. In order to obtain a curtain that is more tightened when it is lowered, the fabric is provided with tunnels that are stitched at different distances and extend across the full width of the curtain. Then, weightings, the so-called strengthening rods (or baleens) are introduced into the said tunnels mentioned above.

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In order to be able to give the folding curtains a high quality, a few things are important:

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- tunnels stitched in straight lines;
- the possibility to remove the strengthening rods (baleens) from the curtains easily, so that they may be cleaned;
- strengthening rods ensuring a constant tension, so that the curtains will get a nice and straight aspect.

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In order to make the tunnels perfectly straight, use is made of an automatic tunnel stitching device.

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In order to be able to remove the strengthening rods from the curtains in a simple manner, it is known to provide an opening, more specifically a buttonhole on the lower side

of the tunnel.

However, when a tunnel is provided with a buttonhole by means of the automatic tunnel stitching device, the following will occur: as the number of tunnels of each curtain will increase, the buttonhole will slide upwards when stitching the tunnels, because of which the buttonhole will be no longer in the lower part of the tunnel but on the upper part, so that it will become visible. This means a decrease in quality of the curtain, therefore no buttonholes may be provided when an automatic stitching device is used. It is only possible to make the perfect use of this machine if the tunnel is closed by stitching, but then it becomes impossible to remove the strengthening rods from the curtain for cleaning purposes.

The purpose of this invention is to provide a method which will make it possible to manufacture high quality folding curtains where it is possible to remove the strengthening rods from the curtains in a simple manner, so that it will be possible to clean them.

The purpose of the invention is attained by providing a method for closing at least one tunnel extending across the width of a folding curtain, after a strengthening rod has been provided in this tunnel, a strengthening rod being provided in the tunnel at least one extremity of which is comprising a number of pointed projections, and the tunnel being closed by pricking the said projections through the wall of the tunnel.

By closing a tunnel of a folding curtain in accordance with this method, it will be possible to remove the strengthening rods from the tunnel very easily.

Preferably, the said projections are provided on an element made of synthetic material, for instance. The said element may be manufactured by means of injection moulding, for  
5 instance.

In a preferred method according to the invention, the said projections are movable against a spring force. The advantage of this method is that the strengthening rods  
10 will ensure a constant tension for one thing, because of which the curtains will have a nice and straight aspect. For another thing, it will be possible to press the pointed projections, for instance, by means of a narrow object, thus releasing them from the wall of the tunnel and  
15 allowing the strengthening rods to be removed from the tunnel.

In a more preferred method according to the invention, the said projections are part of a terminal element provided on  
20 the strengthening rod. More particularly, the said terminal element is carried out in the form of a sleeve provided at the extremity of the strengthening rod.

In a most preferred method according to the invention, the  
25 terminal element is provided with a coiled spring in order to exert a spring force on the said projections.

Another object of the present invention is a folding curtain comprising at least one tunnel extending across the  
30 width of the curtain, which is provided with a strengthening rod, the said strengthening rod comprising a number of pointed projections at least at one extremity and the said projections pricking through the wall of the tunnel in order to close off the tunnel.

Such folding curtains have the advantage that the strengthening rods may be removed from the tunnel in a simple manner.

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In a preferred embodiment of the folding curtain according to the invention, the said projections are movable against the force of a spring. This makes it possible to press the projections, for instance, by means of a narrow object and,  
10 thereby remove the strengthening rods from the tunnel in a simple manner.

In a more preferred embodiment of the folding curtain according to the invention, the said projections are part  
15 of a terminal element provided at the extremity of the strengthening rod.

In a most preferred embodiment of the folding curtain according to the invention, the said terminal element  
20 comprises a sleeve-shaped jacket containing a coiled spring and an element provided with the said pointed projections, and the element being movable against the force of the coiled spring. Preferably, the said element is made of synthetic material.

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By manufacturing folding curtains provided with said terminal element, various advantages are obtained:

- the strengthening rods will ensure a constant tension;
- the tunnel may be closed without being obliged to close it  
30 by stitching;
- the automatic tunnel stitching device can be used;
- no buttonhole has to be provided which means an important gain of production time.

Furthermore, this invention relates to a strengthening rod for a folding curtain, the said strengthening rod comprising a number of pointed projections at least at one extremity, and the said projections being provided to prick  
5 through the wall of the tunnel in order to close off the tunnel. The said strengthening rods of this patent application may be carried out both in a solid and in a hollow embodiment.

10 In a preferred embodiment of the strengthening rods according to the invention, the said projections are part of a terminal element provided on the strengthening rod. Furthermore, the said strengthening rod comprises a sleeve-shaped jacket containing a coiled spring and an element  
15 provided with the said pointed projections, the element being movable, against the force of the coiled spring, from a first to a second position, the element in its second position being situated within the space surrounded by the sleeve-shaped jacket.

20 In a most preferred embodiment, the strengthening rod according to the invention is provided in a folding curtain according to any one of the claims 6 up to and including 10.

25 In order to further clarify the properties of the present invention, and to point out its additional advantages and particulars, a more detailed description of the method applied and of a folding curtain manufactured in accordance  
30 with this method will now follow. It may be obvious that nothing in the following description may be interpreted as being a restriction of the protection of the present invention demanded for in the claims.

In this description, by means of reference numbers, reference is made to the attached drawing in which:

- figure 1 is a representation of a folding curtain according to the invention;
- 5 -figure 2 is a detailed drawing of (A), more particularly of the terminal element;
- figure 3 is representing another embodiment of a terminal element;
- figure 4 is a representation of the first (figure 4a) and  
10 second positions (figure 4b) of element 8.

A folding curtain (1) as represented in figure 1 has systems which are moving up and down the fabric of the curtain (1), for instance, by means of cords. They can be  
15 operated, as represented in figure 1, by a cord or chain system.

By stitching, horizontal tunnels (2) are made in the fabric of the curtain at regular intervals by means of an  
20 automatic stitching device. At one extremity, the tunnels (2) are closed by stitching. Then, elongated strengthening rods (3), which may be made solid or hollow, are inserted into these tunnels (2). They cause the fabric to fold when the curtain (1) is raised and the folds will cover one  
25 another. When lowered a segmented division will show.

The strengthening rods (3), made of glass fibre, for instance, are made somewhat shorter than the width of the folding curtain (1) and they are provided with a terminal  
30 element (5), at the extremity of the tunnel not closed by stitching.

As represented in figure 2, the terminal element (5) is carried out in the form of a sleeve (6), provided on the

extremity of a strengthening rod (3).

The terminal element (5) comprises:

-a sleeve-shaped jacket (6);

5 -an element (8) equipped with pointed projections (4);

-a coiled spring (7) which will render the element (8) movable against the force of the spring;

-and, if needed, an additional connecting piece (9).

10 The sleeve (6), as carried out in figure 2, has two openings situated opposite one another, one opening sliding over the strengthening rod (3) and the other opening being provided with retaining edges. The retaining edges prevent the element (8) from being pushed out of the sleeve (6). In  
15 order to be able to move the element (8) against the spring force, the sleeve (6) has likewise been provided with a coiled spring (7).

In another embodiment, represented in figures 3 and 4,  
20 where the strengthening rod (3) has been made hollow, the terminal element (5) is provided on the hollow strengthening rod (3), by means of a connecting piece (9) mounted on the sleeve (6).

25 Therefore, in order to close off a tunnel (2) of a curtain (1) according to the method in accordance with the invention, on the side of the tunnel (2) not closed off by stitching, either a terminal element (5) is slid over the strengthening rod (3), or a terminal element (5) is slid  
30 into the hollow strengthening rod by means of a connecting piece (9). Then, the extremity not closed by stitching should be kept somewhat closed, allowing the pointed projections (4) of the element (8) to prick through the wall of the tunnel, thus closing off the tunnel. The

element (8) is now situated in its first position (figure 4a).

5 In order to reopen the tunnel (2), and thus being able to  
remove the strengthening rods (3) again, pressing the  
element (8) by means of a narrow object, for instance, a  
tooth pick, will suffice. This will bring the element (8)  
into its second position (see figure 4b) and the  
10 projections (4) will free themselves from the wall of the  
tunnel. Because of the force of the spring (7), the  
terminal element (5) will leave the tunnel (2) and the  
strengthening rod may be removed again.

15 Furthermore, the terminal element (5) may be provided with  
a recess (10), for instance, in the shape of a flat eight,  
in order to keep the element (8) in its first or second  
position. The transition from the second, in which the  
element (8) is situated within the space surrounded by the  
sleeve-shaped jacket, to the first position occurs by  
20 moving the sleeve (6) slightly backwards.

An additional advantage of the terminal element (5) lies in  
the fact that the spring (7) will maintain a constant  
pressure on the folding curtain.